

# INPLASY

## The impact of virtual reality simulation in dental education: A systematic review of learning outcomes and student engagement

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### ADMINISTRATIVE INFORMATION

**Support** - King Khalid University.

**Review Stage at time of this submission** - Completed but not published.

**Conflicts of interest** - None declared.

**INPLASY registration number:** INPLASY202410096

**Amendments** - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 January 2024 and was last updated on 23 January 2024.

## INTRODUCTION

**Review question / Objective** The importance of available VR simulators and their impact on students' learning and outcomes.

**Rationale** VR may or may not totally replace the conventional teaching methods for dental education.

**Condition being studied** VR, Dental Education.

## METHODS

**Search strategy** Different search databases such as PubMed, ScienceDirect, Google Scholar, Cochrane Library, and Scopus were searched (up

to 31 December 2023) for the most relevant studies using various keywords and Medical subject headings (MeSH) terms such as virtual reality, virtual reality simulators, virtual reality simulation, and dental education.

**Participant or population** Individuals or dental students undergoing dental education or training.

**Intervention** Utilization of VR simulators as an educational tool.

**Comparator** Other teaching or training methods.

**Study designs to be included** We took into account both descriptive (case control and cohort) and interventional (trials) based research that was written in English for this review.

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**Eligibility criteria** Randomized controlled trials (RCTs), prospective, and other study designs that compared VR simulation with other teaching methods.

**Information sources** PubMed, ScienceDirect, Google Scholar, Cochrane Library, and Scopus.

**Main outcome(s)** Positive impact of VRS in terms of learning, performance, and skills improvement.

**Additional outcome(s)** Study participants showed improvement in their interaction, reduced retention times, performed procedures without supervision, and increased their confidence.

**Data management** Data was processed in Microsoft Excel (Excel 365; Microsoft Corp., Redmond, WA, USA). For export and data manipulation, Google Sheets (Alphabet Inc., Mountain View, CA, USA) were also used.

**Quality assessment / Risk of bias analysis** Two researchers independently assessed the risk of bias of the included articles using —JBI critical appraisal tools.

**Strategy of data synthesis** Two review authors (RS and YA) used the studies to help select studies and document their decisions. This was done in two stages, with the first stage consisting of a title and abstract screening of all studies against the inclusion criteria, and the second stage being a full text assessment of papers that were deemed potentially relevant based on the initial screening.

**Subgroup analysis** The data was compiled from a variety of articles:

- Author(s), year of publication, country, study design.
- Total number of patients/datasets.
- Training/validation datasets
- Test datasets
- Aim of the study.

**Sensitivity analysis** NA.

**Language restriction** Articles only in English were Selected.

**Country(ies) involved** Saudi Arabia, Armenia.

**Keywords** Virtual reality system, simulators, simulations, dental training, students.

**Dissemination plans** All the data and the article will be share after the publication.

### Contributions of each author

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